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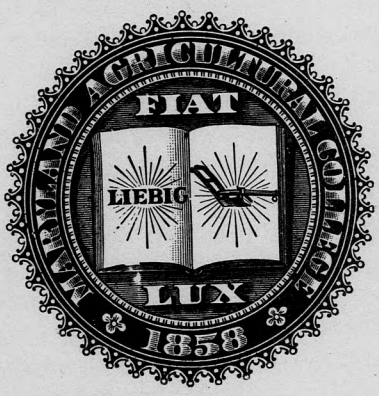

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ADDRESS

Chemical Department, Maryland Agricultural College,

COLLEGE PARK, MD.

ANALYSIS OF
COMMERCIAL FEEDING STUFFS SOLD IN MARYLAND

BY THE CHEMICAL DEPARTMENT OF THE
MARYLAND AGRICULTURAL COLLEGE.

DR. H. B. MCDONNELL, *State Chemist.*
J. B. ROBB, M. S., *Assistant Chemist.*
T. R. GOUGH, B. S., *Assistant Chemist.*
A. B. FOSTER, *B. S., Assistant Chemist.*
R. H. KERR, B. S., *Assistant Chemist.*
WM. R. WHARTON, B. A., *Assistant Chemist.*

The accompanying table contains the analyses of commercial feeding stuffs tested in this laboratory during the year. Our aim has been to analyze concentrated feeds, by-product feeds and proprietary feeds, omitting common feeds, as bran and middlings, which are well known, as we had no reason to suspect that they were being adulterated. Nor have we attempted to inspect "condimental feeds" and nostrums which are sold as medicines rather than feeds. We publish, as Table 2, however, the results of analysis of such substances at the Rhode Island Experiment Station, as published in Bulletin No. 94, of that Station.

The analyses given in Table 1 are not complete, to be sure, as feeds contain other substances than protein and fat, as moisture, fiber (or cellulose), mineral matter, and often starch, sugar, etc. However, the ordinary feeds and "roughage" of the farm—corn, hay, fodder, straw, etc.—contain all of these, but do not contain enough protein to make a well-balanced ration, especially for growing animals and milk and egg production. Hence the most important question in buying feeds to supplement these is the amount of protein.

Protein is the nitrogenous part of the feed, and the "crude protein," which is what is given in this bulletin, is six and one-quarter times the nitrogen, and in feeds, as in fertilizers, it is the most expensive constituent, and the value of the feed is largely determined by its amount. Poor feeds and feed adulterants, straw, oat hulls, cottonseed hulls, corn cobs, etc., contain but little protein. Protein is absolutely necessary to the formation and repair of nearly all parts of the animal, except the fat, which is in reality the reserve fuel supply. Protein contains the elements to form fat, but it would be entirely too expensive and wasteful to use it for this purpose, as the nitrogen is wasted.

A few of the most important feeds high in protein are the following: Cottonseed Meal—When cotton is picked the cotton fiber is attached to the seed, or rather to the hull, which covers the seed. In ginning the cotton is torn off close to the hull, leaving considerable lint attached; after this operation the seed is hulled. Then the hulled

seed is crushed, heated and pressed to remove as much oil as possible; there remains, however, eight or ten per cent. The pressed cake is ground for feed, the result being cottonseed meal of commerce. This should contain at least forty per cent. of protein.

The cottonseed hulls make a coarse feed, about equal to wheat straw. They are sometimes ground up in the meal as an adulterant. This makes a dark-colored meal, and as hulls contain but four per cent. of protein it necessarily reduces the percentage of protein.

Linseed Meal, Flaxseed Meal and Oil Meal are terms applied to the product from flaxseed by a process similar to the treatment of cottonseed, as given above, except that the flaxseed does not bear lint or hulls. This gives "old process" meal, which contains about thirty-six per cent. protein, and seven per cent. of oil. In the "new process" the oil is extracted by a solvent, such as benzine or carbon bisulphid, and the excess of the solvent is removed by blowing steam through the meal. This gives a meal containing about thirty-eight per cent. protein and only two per cent. of oil.

Gluten Meal is a by-product in making starch and glucose from corn. The protein of the corn is not used in the process, but most of it remains in the undissolved residue, which, after drying, is the gluten meal. The first part of the process is to separate the hull and germ from the balance of the kernel. Sometimes the hulls are ground up with the gluten meal, making a "gluten feed." The "gluten meal" should contain about thirty-five per cent. of the protein; the "gluten feed" about twenty-five per cent. of protein.

Germ Oil Meal is the ground residue which remains after pressing the ground corn germ to remove the oil, as in treating flaxseed for the same purpose. Germ meal contains about twenty-three per cent. of protein, and eight or ten per cent. of oil.

Malt Sprouts.—In preparing malt from barley the grain is steeped in water, and allowed to sprout. In this process the starch is converted into sugar. The grain is then dried, and the sprouts sifted or blown off. The dried sprouts contain about twenty-three per cent. of protein.

Dried Brewer's Grains and Dried Distiller's Grains.—In making malt liquors, or distilled liquors, grain is generally used, the starch of which, by ferments, is converted into sugar, and this, by further fermentation is converted into alcohol. The residue, when dried, it will be seen, is somewhat analogous to the gluten feed above described, being changed somewhat in appearance, taste, odor, etc., by the fermenting process. The dried grains should contain from twenty to thirty per cent. of protein.

No.	Name of Manufacturer or Agent.	Name of Food Stuff.	Place of Sampling.
7034	American Cereal Company, Balto., Md.	Victor Corn and Oat Feed.	Baltimore
7053	American Hominy Co., Chicago, Ill.	Hominy Feed	Linwood
7030	American Linseed Co., Chicago, Ill.	Cleveland Flax Meal	Taneytown
7048	Armour Fertilizer Co., Baltimore Md.	Meat Meal, for poultry.	Baltimore
7049	" " "	Pure Blood	Baltimore
7025	Atlas Feed & Milling Co., Peoria, Ill.	Atlas Gluten Meal	Westminster
7050	Baugh & Sons Company, Baltimore, Md.	Meat Meal	Baltimore
7026	R. W. Biggs & Co., Memphis, Tenn.	Canary Brand Cotton Seed Meal.	Westminster
7031	W. G. Bishop & Co., Baltimore, Md.	Old Process Linseed Meal.	Westminster
7052	" " "	King Corn and Oat Feed.	Baltimore
7059	" " "	King Corn and Oat Feed.	Baltimore
7029	" " "	Prime Cotton Seed Meal.	Taneytown
7039	Blomo M'f'g. Co., New York, N. Y.	Blomo Feed for Horses.	College Park
7035	Bowker Co., Boston, Mass.	Bowker's Animal Bone.	New Windsor
7045	F. W. Brode & Co., Memphis, Tenn.	Owl Brand Pure Cotton Seed Meal.	Westminster
7027	Robt. B. Brown Oil Co., St. Louis, Mo.	Cotton Seed Meal	Linwood
7028	" " "	Old Process Linseed Meal.	Linwood
7032	Cotton Oil & Fibre Co., Norfolk, Va.	Prime Cotton Seed Meal.	Darlington
7024	Dairy Feed Co., Chicago, Ill.	Western Dairy Feed	Hagerstown
7040	Glucose Sugar Refining Co., Chicago, Ill.	Corn Oil Cake Meal	Middletown
7047	Great Western Cereal Co., Chicago, Ill.	Boss Corn and Oat Feed.	Perryman
7042	The H-O Co., Buffalo, N. Y.	H-O Dairy Feed.	Cumberland
7055	" " "	" " "	Bel Air
7043	" " "	Poultry Food	Cumberland
7056	" " "	H-O Horse Feed	Bel Air
7041	Hugh Petitt & Co., Memphis, Tenn.	Cotton Seed Meal	Frederick
7037	Midland Linseed Co., Minneapolis, Minn.	Old Process Linseed Meal.	Linwood
7054	Proctor & Bently, Baltimore, Md.	O. K. Feed	Baltimore
7060	Daniel Rider, Baltimore, Md.	Cotton Seed Meal, Elk Brand.	Baltimore
7051	Warner Sugar Refining Co., Chicago, Ill.	Gluten Feed	Chicago, Ill

No.	Protein		Fat or Ether Extract.	
	Found.	Guaranteed.	**Found.**	Guaranteed.
7034	9.06	9.00	4.71	4.00
7053	11.06	10.24	7.93	7.72
7030	37.03	38.00	3.82	1.00
7048	47.18	.....	12.41	.....
7049	80.75	87.00	.35	2.50
7025	35.12	36.00	15.54	11.50
7050	55.00	57.00	17.63	16.00
7026	44.82	43.00	11.82	9.00
7031	32.60	33.00	7.02	7.00
7052	8.40	8.00	4.65	4.00
7059	7.88	8.00	4.28	4.00
7029	42.95	40.00	10.89	8.00
7039	17.39	....	3.47	.....
7035	33.76	30.00	8.94	5.00
7045	44.87	43.00	12.23	9.00
7027	44.74	43.00	9.56	9.00
7028	35.26	34.00	8.75	6.50
7032	47.01	43.00	12.62	9.00
7024	10.66	16.25	3.36	4.00
7040	24.56	24.00	10 61	10.00
7047	8.13	8.05	3.84	4.00
7042	18.56	18.00	4.98	4.50
7055	16.75	18.00	4.25	4.50
7043	18.43	17.00	5.95	5.50
7056	13.85	12.00	4.52	4.50
7041	42.94	43.00	12.20	9.00
7037	33.06	34.00	8.61	6.50
7054	9.91	9.00	3.17	3.00
7060	44.25	40.00	10.02	8.50
7051	20.04	28.00	2.73	3.50

ANALYSES OF CONDIMENTAL FEEDS.

(FROM RHODE ISLAND EXPERIMENT STATION, BULLETIN NO. 94.)

Sample Number.	Brand.	Manufacturer.	Price per package.	Approx. weight of package. (pds.)	Pounds in One Hundred.							Ingredients Found.
					Water.	Protein.	Fat.	Fiber.	Nitrogen-free extract.	Ash.		
										Total Ash.	Common Salt.*	
368	Rust's Egg Producer.	William Rust & Sons, New Brunswick, N. J.	$ 25	1	6.06	20.56	7.31	5.21	5.65	55.21	....	Bone, oyster shells, millet, and red pepper.
369	Nutriotone	W. D. Carpenter Co., Chicago, Ill.	1.00	5	10.87	19.31	7.06	5 95	36.79	20.02	12.21	Flax-seed, cotton-seed and corn meal, millet, charcoal, salt and fenugreek.
371	Poultriotone	W. D. Carpenter Co., Chicago, Ill.	25	1	9.75	16.19	2.67	8.15	44.46	18.78	3.63	Gluten meal, corn meal, bone, salt, charcoal, and wheat offal.
372	Sheridan's Cavalry Condition Powder	I. S. Johnson & Co., Boston, Mass.	25	¼	8.24	21.19	15.65	14.30	22.71	17.91	.....	Linseed meal, charcoal, sulfur, Epsom salt, Glauber salt, and tricalcic-phosphate.
373	Pratt's Animal Regulator	Pratt Food Co., Philadelphia, Pa.	25	1¼	8.75	10.06	4.78	3.71	60.90	11.80	9.90	Corn meal, charcoal, salt, gentian, and possibly fenugreek.
374	Pratt's Poultry Food	Pratt Food Co., Philadelphia, Pa.	10	½	9.20	14.81	6 96	5.65	57.33	6.05	....	Corn meal, wheat offal, sulfur, and iron oxid.
399	Pratt's Food for Horses and Cattle.	Pratt Food Co., Philadelphia, Pa.	75	12	9.69	14.13	7.24	7.56	54.81	6.57	4.46	Corn meal, wheat offal, and salt. The odor of fennel was noticed.
389	International Stock Food.	International Stock Food Co., Minn., Minn.	25	2	7.80	13.44	4.57	10.82	44.95	18.42	16.50	Wheat offal, pepper, charcoal, and salt.

*Calculated from the chlorin found.

ANALYSES OF CONDIMENTAL FEEDS.—Concluded.

Sample Number.	Brand.	Manufacturer.	Price per package.	Approx. weight of package. (lbs.)	Pounds in One Hundred.							Ingredients Found.
					Water.	Protein.	Fat.	Fiber.	Nitrogen, free Extract.	Ash.		
										Total Ash.	Common Salt.*	
390	International Poultry Food..	International Stock Food Co., Minn., Minn	$ 25	2	9.70	15.50	5.11	13.01	50 34	6.34	.....	Wheat Offal, charcoal, and pepper.
397	Banner Pepto Stock Food.....	Banner Food Co., Auburn, N. Y.....	25	2	9.89	22.63	6.11	16.61	33.00	11.76	4.95	Linseed meal, wheat offal, charcoal, common salt and Glauber salt.
398	Baum's Horse and Stock Food. ...	Baum's Castorine Co., Syracuse, N. Y.....	1 00	10	11.73	26.38	3.83	20.03	26.10	11.93	3.63	Linseed meal, charcoal, sulfur, common salt, and Epsom salt.
411	Baum's Poultry Food..	Baum's Castorine Co., Syracuse, N. Y.....	25	2	5 98	19.13	8.29	14.97	30.47	21.16	4.95	Linseed meal, wheat offal, sulfur, charcoal, common salt, Glauber salt, and iron oxid.
415	Dr. Hess' Poultry Pan-a-a-a.	Dr. Hess & Clark, Ashland, O.....	25	1½	8.00	11.94	2.57	4.69	37.70	35.10	14.85	Wheat offal, common salt, iron oxid, and calcium sulfate.
416	Dr. Hess' Stock Food..	" " "	50	7	9.83	14.69	3.07	7.22	51.35	13·84	8.09	Wheat offal, charcoal, common salt, and calcium sulfate.
417	White's Stock Food.	White Food Co., Taunton, Mass.....	1 25	25	10.87	19.44	5.94	8.31	49.79	5.66	0 83	Wheat feed, and common salt.

*Calculated from the chlorin found.

LIST OF FEED STUFFS LICENSED FOR THE YEAR ENDING JULY 1st, 1904.

AMERICAN CEREAL CO., CHICAGO, ILL.
- Schumacher's Stock Feed.
- Quaker Dairy Feed.
- Buckeye Wheat Feed.
- Vim Oat Feed.
- American Poultry Food.
- Victor Corn and Oat Feed.

AMERICAN COTTON OIL CO., NEW YORK, N. Y.
- Cottonseed Meal.

AMERICAN LINSEED CO., NEW YORK, N. Y.
- Linseed Meal.

W. G. BISHOP & CO., BALTIMORE, MD.
- Cottonseed Meal.
- King Corn and Oat Feed.

GREAT WESTERN CEREAL CO., CHICAGO, ILL.
- Boss Corn and Oat Feed.
- Friends' Oat Feed.
- Royal Oat Feed.

THE H-O COMPANY, BUFFALO, N. Y.
- H-O Poultry Feed.
- H-O Horse Feed.
- H-O Dairy Feed.

DANIEL RIDER, BALTIMORE, MD.
- Elk Brand Cottonseed Meal.

WARNER SUGAR REFINING CO., CHICAGO, ILL.
- Gluten Feed.

The attention of manufacturers and dealers is called to the above list of licensed brands of commercial feeding stuffs. All persons selling, or offering for sale, feeds not on this list, except those exempt under the law, which is published herewith, are liable for the amount of the license, and also liable for a fine, as penalty for selling without the license. Checks in payment for license should be in favor of the Treasurer of the Maryland Agricultural College.

For licenses, or further information, address:

DR. H. B. McDONNELL, State Chemist, College Park, Md.

FEED STUFF LAW OF MARYLAND. (Approved, April 5, 1900.)

Section 1. Be it enacted by the General Assembly of Maryland, That the following new Sections be added to Article 48 of the Code of Public General Laws, title "Inspections," under the new sub-title, "Feed Stuffs," to follow Section 83, and to be known as Sections 84, 85, 86, 87, 88, 89, 90, 91 and 92, and to read as follows:

84. Every manufacturer, company or person who shall sell, offer or expose for sale or for distribution in this State any concentrated commercial feeding stuff as defined in the following section of this sub-title, used for feeding farm live stock and poultry, shall affix to every package of such feeding stuff, in a conspicuous place, on the outside thereof, a plainly printed statement, clearly and truly certifying the number of net pounds in the package sold or offered for sale, the name or trade-mark under which the article is sold, the name of the manufacturer or shipper, the place of manufacture, the place of business, the source of the food principles, and a chemical analysis stating the percentage of crude protein, allowing one per cent. of nitrogen to equal six and one-fourth of protein, and of crude fat it contains, both constituents to be determined by the method adopted, at the time, by the Association of Official Agricultural Chemists.

85. The term concentrated commercial feeding stuff, as here used, shall not include hays and straws, the whole seeds nor the unmixed meals made directly from the entire grains of wheat, rye, barley, oats, Indian corn, buckwheat and broom corn. Neither shall it include wheat, rye and buckwheat brans or middlings, not mixed with other substance, but sold separately, as distinct articles of commerce, nor pure grain ground together. The agent of the State hereinafter authorized to make those inspections, is fully empowered to take samples of these excepted articles when found, and, if upon analysis, they prove to be adulterated, the vender shall be in all respects subject to the penalties hereinafter set forth for the adulteration of concentrated commercial feeding stuff.

86. The term concentrated commercial feeding stuff, as here used, shall include linseed meals, cotton-seed meals, cotton-seed hulls, pea meals, cocoanut meals, gluten feeds, maize feeds, starch feeds, sugar feeds, dried brewer's grains, malt sprouts, hominy feeds, cereline feeds, rice meals, oat feeds, corn and oat chops, ground beef, fish or animal meals, mixed feeds, all patented or trade-marked foods and all other materials of similar nature not included within the preceding Section of this sub-title.

87. Before any manufacturer, company or person shall sell, offer or expose for sale in this State any concentrated commercial feeding stuff, as defined in the preceding Section of this sub-title, he or they shall for each and every feeding stuff bearing a distinguishing name or trade-mark, file with the State Chemist of the Maryland Agricultural College, a certified copy of the statement named in Section 84 of this sub-title; said certified copy to be accompanied, when the State Chemist shall so request, by a sealed package containing at least one pound of the feeding stuff to be sold or offered for sale, and the company or person furnishing said sample shall thereupon make affidavit that said samples correspond within reasonable limits to the feeding

stuff which it represents in the percentage of protein and fat which it contains.

88. Before any concentrated commercial feeding stuff, as defined in Section eighty-six of this Act is sold, offered or exposed for sale in this State, the manufacturer, importer, agent or seller thereof shall pay to the Treasurer of the Maryland Agricultural College an inspection fee of twenty dollars for each brand or kind of concentrated commercial feeding stuff contemplated to be sold, and shall receive therefor from said treasurer a license to sell such brand of concentrated commercial feeding stuff until the first day of July next following; provided that when any manufacturer, importer or dealer shall have paid the inspection fee as herein provided, it shall not be necessary for any other person, as his agent or representative, to pay said fee.

89. Any manufacturer, importer or person who shall sell, offer or expose for sale or for distribution in this State any concentrated commercial feeding stuff, as defined in Section 86 of this Act, without complying with the requirements of the preceding sections of this sub-title, or any feeding stuff which contains substantially a smaller percentage of constituents than are certified to be contained shall, on conviction in a court of competent jurisdiction, be fined not more than one hundred dollars for the first offense, and not more than two hundred dollars for each subsequent offense.

90. The State Chemist of the Maryland Agricultural College shall annually analyze, or cause to be analyzed, at least one sample (to be taken in the manner hereinafter prescribed) of every concentrated feeding stuff sold or offered for sale under the provisions of this sub-title; said State Chemist is hereby authorized and directed in person, or by deputy, to take a sample, not exceeding two pounds in weight, for said analysis, from any lot or package of concentrated commercial feeding stuff, which may be in the possesion of any manufacturer, importer, agent or dealer, or in *transitu* in this State. The result of the analysis of the sample or samples so procured, together with such additional information as circumstances advise, shall be published in reports or bulletins from time to time.

91. Any person who shall obstruct the State Chemist or his deputy, when in the discharge of his duty, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be punished by a fine of not less than one hundred ($100) dollars, or more than five hundred ($500) dollars, or by imprisonment for not less than one month or more than six months, or by both such fine and imprisonment.

92. Whenever the State Chemist becomes cognizant of the violation of any of the provisions of this sub-title he shall report such violation to the State's Attorney having jurisdiction, who shall prosecute the party or parties thus reported, but it shall be the duty of said State Chemist to notify the manufacturer, importer or dealer in writing, before reporting same to State's Attorney, and give him not less than thirty days thereafter in which to comply with the requirements of this sub-title, but there shall be no prosecution in relation to the quality of any concentrated commercial feeding stuff if the same shall be found substantially equivalent to the certified statement named in Section 87 of this sub-title.

A RARE CHANCE

FOR

YOUNG FARMERS AND DAIRYMEN.

YOUNG STOCK OF THE STATION HERD.

SHORT WINTER COURSES

IN

AGRICULTURE AND DAIRYING.

MARYLAND AGRICULTURAL COLLEGE AND

EXPERIMENT STATION,

COLLEGE PARK, MARYLAND.

1903.

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Students Planting Cannas.

THE experience of the most progressive and successful agricultural States has absolutely demonstrated two facts. First, that in this day of close competition and low prices, a farmer, in order to be successful, must practice scientific methods in handling his crops and stock; and second, that the place for the farmer to learn scientific methods is at his agricultural college and experiment station.

Fully impressed with the truth of the above facts, the Maryland Agricultural College and Experiment Station present to the farmers of the State the following prospectus of their Short Courses in Agriculture and Dairying for the winter of 1903-1904.

During the seven years these short courses have been given they have been modified and enlarged, as experience dictated, to suit the needs of the practical farmer and dairyman, and it may be stated with perfect confidence that in no other way can a young man engaged in either of these pursuits so profitably invest a small amount of time and money as in taking one of these short courses.

The attendance on these short courses has been limited heretofore by lack of adequate boarding facilities for the students, but that difficulty has been at least temporarily remedied by the erection of a building specially designed for the accommodation of special course students.

TERMS.

Tuition and room free. Table board will be furnished by the College, at four dollars per week. Students will be expected to furnish their own bedclothes, pillows, towels and napkins.

SHORT WINTER COURSE IN AGRICULTURE.

This course will begin on Monday, January 4th, 1904, and will continue ten weeks. It will be open to all young men over 16 years of age. The aim of the course will be to give the largest possible amount of information on strictly agricultural topics, by means of lectures, laboratory instruction and practical work in the field, orchard, greenhouse, stables, creamery and carpenter and blacksmith shops. Students will be required to take not less than two hundred and fifty hours of work.

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SYNOPSIS OF COURSE.

I.—Soils.—Twelve Hours.

Prof. W. T. L. Taliaferro.

The examination and classification of soils; the relation of soils to water, air, heat; adaptation of soils to crops; improvement of physical condition of soils; drainage, ventilation, cultivation, green manures, cover crops, rotation of crops.

II.—Plant Production.—Ten Hours.

Prof. W. T. L. Taliaferro.

Varieties, improvement, soil requirements, cultivation, planting and harvesting of field crops, including corn, small grains, legumes, grass, silage and soiling crops, potatoes and root crops. Special attention is given to the improvement of farm crops by systematic breeding and selection.

III.—Farm Live Stock.—Eighteen Hours.

Prof. W. T. L. Taliaferro.

Principal breeds of horses, cattle, sheep and hogs; their uses and adaptation; principles and practice of stock breeding; stock judging.

IV.—Stock Feeding.—Ten Hours.

Prof. H. J. Patterson.

The composition and digestibility of the different feedings stuffs; what is meant by a well-balanced ration, and the calculation of such rations with given materials; feeding for maintenance, fat, butter, eggs, wool, milk; the effect of food on quality; the preservation and preparation of coarse fodders; ensilage; steaming and cooking food, etc., etc. Not only will the theory be studied, but a careful carrying out of the theory in practice will be the features of the course.

V.—Tobacco.—Five Hours.

Prof. H. J. Patterson.

The plant bed, culture, harvesting, curing, marketing, and effects of fertilizing elements upon the quality.

VI.—Manures.—Twenty Hours.

Dr. H. B. McDonnell.

The best methods of preserving and applying farm manure. The relative value of the different manures and fertilizers. The maintenance of soil fertility. The place of lime in the farm economy.

VII.—Agricultural Chemistry.—Twenty Hours.

Dr. H. B. McDonnell and Mr. Foster.

Soils; their formation, classification and properties. The mineral constituents of soils and their bearing on plant growth. The best means of supplementing them when needed for plant growth.

VIII.—Dairying.—Forty Hours.

Prof. C. F. Doane.

The dairy instruction will consist of lectures on bacteriology, and the necessary precautions to insure a good product; lectures on the obtaining of cream from the milk, comparing the old gravity process and the use of separators; on milk testing with the Babcock test, and the place of the test in modern dairying, and on butter making with the use of the acid test, which practically insures the making of good butter. The lectures on milk testing and butter making will be supplemented by practical instruction, and each student will be required to handle the Babcock test as well as the separator and the churn.

IX.—Veterinary Science.—Twenty Hours.

Sam'l S. Buckley, D. V. S.

Digestion of food under normal conditions.

Results of faulty conditions in feeding stock.

Disorders and diseases of digestive tract, and correction of the same.

The use of medicines and performance of operations in emergency cases among animals by the non-professional.

Bandages, and method of applying them.

Method of detecting lameness and treating certain forms of lameness.

Points on the examination of horses before purchase.

Cattle, and some of their disorders.

Infectious diseases, and how to deal with them. The limited

time for the course will necessitate a brief consideration of each subject, but it is hoped to place the matter before students in such a way as to be of practical benefit in the care of live stock.

X.—Carpentry and Blacksmithing.—Fifty-five Hours.

Prof. J. H. Mitchell and Mr. Blandford.

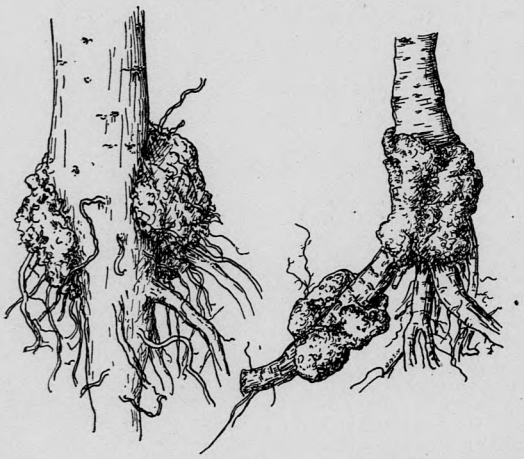
A knowledge of this is very important to the agriculturist of this day. The equipment for this instruction is complete. The industrious, eager seeker after knowledge will accomplish much in the line of this work in the time allotted.

1. Sharpening of tools.
2. Adjustment of tools.
3. Sawing, Planing, Chiseling and Boring.

Practical Lessons in Blacksmithing.—Mechanism of, and care of forge and smith's tools. Preparation of forge for fire. Building and managing the fire and fluxes. Forging, bending, welding.

XI.—Plant Physiology and Pathology.—Fifteen Hours.

Prof. J. B. S. Norton.



Crown Gall on Peach and Apple.

Five lectures on the general principles of plant life and structure; how plants live, grow and reproduce, and how they are influenced by different conditions of light, temperature, moisture and other factors

in their surroundings; considered with special reference to agricultural problems. Five lectures on the causes, symptoms and treatment of plant diseases, with practice work in examination, and study of diseased plants, and the preparation and use of remedies and preventatives.

This course will include the discussion of the laws of plant life, the uses and structure of plant parts, nutrition, growth, formation of products by the plant, reproduction by seeds and otherwise, seed testing, useful plants, weeds, poisonous plants, geographical distribution, variation, acclimatization, cause of diseases, parasitic fungi, preparation of fungicides and spraying.

Black Knot of Plum.

XII.—Horticulture —Thirty Hours.

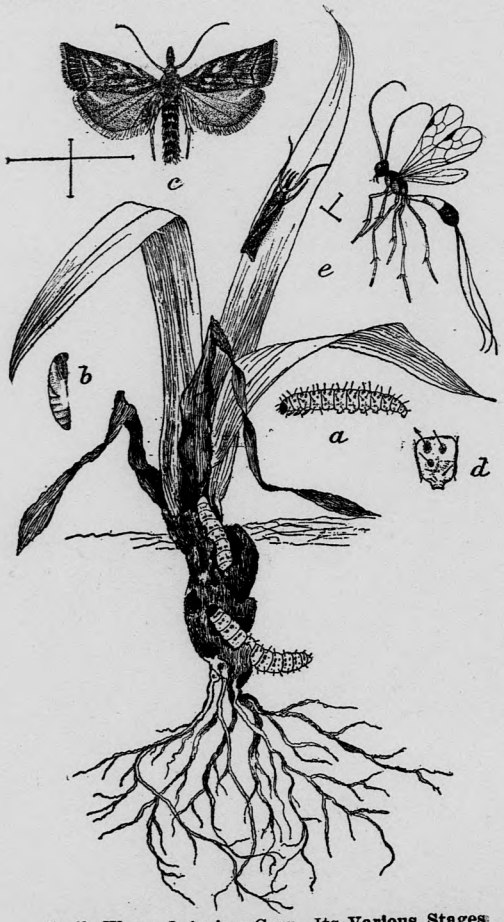
Prof. C. F. Austin.

A discussion of the fundamental principles of fruit and vegetable growing, orchard cultivation, fertilization, pruning, grafting, packing and marketing of fruits. The construction and management of hot-beds, cold frames and the propagation of plants. These lectures will be supplemented by practical work in green houses and orchards.

XIII.—Economic Entomology.—Twenty Hours.

Prof. Thos. B. Symons.

These lectures will treat of the characters of insects in their rela-



Stalk Worm Injuring Corn—Its Various Stages of Development, and its Natural Enemy.

tion to the methods of combating them, together with concise considerations of the life history and habits of some of the more important insects with which the farmer and fruit grower have to deal.

Attention will also be given to the making and application of insecticides.

XIV.—Farm Accounts.—Twelve Hours.

Prof. H. T. Harrison.

A simple, concise and accurate method of keeping farm accounts. Business methods are as necessary to the successful farmer as to the merchant. Neither can do without a practical knowledge of bookkeeping.

XV.—Road Construction and Levelling.—Five Hours.

Prof. Henry Lanahan.

A brief treatment of the principles involved, and the methods used in the location, construction and maintenance of country roads.

An opportunity will be given those desiring it to learn the use of the level in laying out drains, etc. Students wishing to take the work in levelling must report to the instructor in charge within two weeks after the opening of the term.

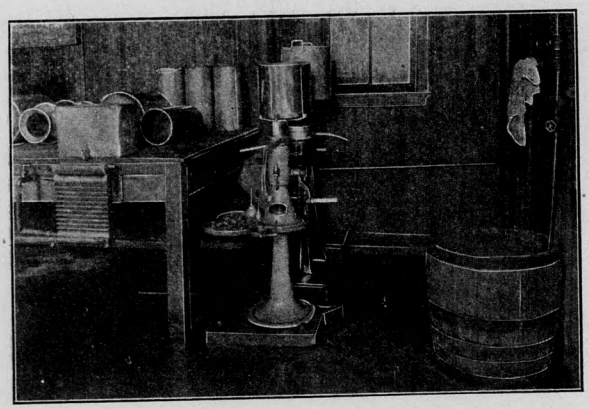
XVI.—Civil Government.—Ten Hours.

Prof. F. B. Bomberger.

The general principles of government; the rights and duties of citizens, and an inquiry into the political institutions of Maryland.

SHORT COURSE IN DAIRYING,

Prof. Chas. F. Doane.



Interior View of Creamery.

There are a great many boys who expect to engage principally in dairying as a life work. For such the College has provided a short course in dairying. Dairymen of the present day need instruction in the new methods which have come to the front and revolutionized the industry in the last few years. This course will commence at the same time as the short course in agriculture, and will last eight weeks. The requirements and conditions are the same as for the short agricultural course.

As the greater part of the dairy work of the State is in making butter in the private dairy, and in producing milk for the city supply, these special lines will be particularly emphasized in the instruction given, though sufficient practical work will be given in butter making to fit a few of the better qualified to take charge of creameries, a large number of which are found in the State. All instruction, as far as possible, will include both theoretical and practical work, and the text book and lectures will be illustrated in the creamery, which is equipped with separators, churn and butter worker, and power and hand Babcock test machines are in daily use.

Separating cream from milk will be taught by lectures and by work with the two separators in the creamery.

Ripening the cream and butter making will be taught by lectures, and the student will be required to do the churning sufficiently to become thoroughly familiar with the entire process.

Milk testing will be taught from text, and students will be thoroughly drilled in the use of the Babcock test.

Bacteriology will be taught from text, and all methods for producing thoroughly clean milk will be discussed.

Feeding the dairy cow will be taught by lectures.

Each student will be expected to provide himself with two white suits, which can be purchased at small cost.

In addition to the regular short course an apprentice course in dairying is offered, which has for its special object the preparation of boys to take charge of dairy herds, as there is a larger demand for such than we have been able to fill. These places usually pay much better wages than can be secured by the ordinary farm hand. The boys taking this course are expected to stay six months, and put in practically all of the forenoon, and an hour in the afternoon, milking, working with the dairy herd and making butter. They will receive instruction in the same subjects as the boys taking the short course in dairying, and to compensate them for their work their board and lodging will be furnished free, the only expense being for the two white suits, necessary bedding, and for washing. Boys over seventeen, and who know how to milk, are wanted, and all such applying will be given preference in the order of their application. As only three apprentices can be accommodated at one time, it may be necessary for applicants to wait some time for their turn.

For further particulars address:

President R. W. Silvester,
Maryland Agricultural College,
College Park, Md.

Or

Director H. J. Patterson,
Md. Agrl. Experiment Station,
College Park, Md.

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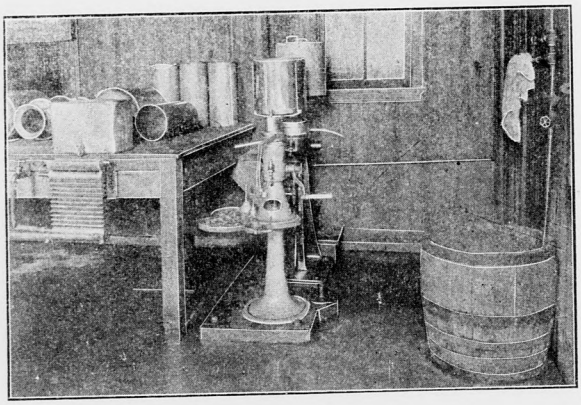

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Student Taking Notes in Crimson Clover Field.

Student Taking Notes in Crimson Clover Field.

.....P. O.

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Dear Sir:

I hereby apply for admittance to the Short Winter

Course in.....

at the Maryland Agricultural College and Experiment Station

commencing January 4th, 1904.

I expect to enter on.....

Name.....

County.....

President,

Maryland Agricultural College,

College Park, Maryland.